

REMARKS

Claims 1-24 are pending and remain for consideration.

Claims 1-3 and 13-15 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Miyazaki (US Patent No. 5,463,197) in view of Nakamura (US Patent No. 6,566,770). The rejection is traversed and reconsideration is respectfully requested.

Miyazaki discloses an apparatus and a method for forming a wire bonding ball (see e.g. title). In contrast to the Examiner's understanding Applicants are of the opinion that Miyazaki does not disclose a power module supplying electrical power to drive the bondhead. Col. 4, lines 27-33 read: *"Fig. 1 is the block diagram showing the construction of the wire bonder including the ball forming apparatus according to the present invention and a wire bonder controller. FIG. 2 is a block diagram showing in detail the power supply circuit of the torch of the ball forming apparatus."* (Emphasis added). Miyazaki does not even mention the term "bondhead" in his patent and he does not mention a power module supplying electrical power to drive the bondhead. Therefore Miyazaki fails to disclose at least

a bondhead,

a power module configured for supplying electrical power for operating a drive of the bondhead,

a power switch configured for controlling the supply of electrical power by the power module to the drive,

at least one emergency switch,

as recited in claim 1.

Nakamura is related to a semiconductor manufacturing apparatus operable with supply of an electric power from a main electric power source wherein, in response to actuation of an emergency-off switch, the main electric power source is disconnected and, before the disconnection, braking control is made to a member

being driven, by use of an electric power from the main electric power source (see abstract).

If the teaching of Nakamura is applied to Miyazaki then the resulting wire bonder would immediately brake the bondhead (that is not even mentioned in Miyazaki's patent) so that it is stopped as soon as possible and then disconnect the main electric power source. The operation of the at least one emergency switch would not produce upon activation a signal for causing the control program to complete a current bond cycle and then suspend the further wiring. For completion of the current bond cycle the bondhead must perform the programmed movements. If the bondhead were to be braked to stop as soon as possible then the current bond cycle could not be completed. It is recited in the patent application on page 2 that such an instantaneous stop of the Wire Bonder in production occurs with great probability in the midst of a bond cycle.

From the above it follows that the teaching of Miyazaki taken either alone or in combination with the teaching of Nakamura would not result in a wire bonder for wiring semiconductor chips, comprising

- a bondhead,

- a power module configured for supplying electrical power for operating a drive of the bondhead,

- a power switch configured for controlling the supply of electrical power by the power module to the drive,

- a timer,

- a control program, and

- at least one emergency switch,

the at least one emergency switch being configured for producing upon activation a signal for causing the control program to complete a current bond cycle and then suspend the further wiring and for starting the timer, the timer being configured for

opening the power switch after a predetermined period of time has elapsed, the predetermined period being sufficient to complete the current bond cycle, as recited in claim 1. Therefore the rejection of claim 1 under 35 U.S.C. §103(a) should be withdrawn and claim 1 allowed.

Neither Miyazaki nor Nakamura taken either alone or in combination teaches or suggests a wire bonder comprising an electrical power supply module guaranteeing on interruption of an external power supply the supply of electrical power to the wire bonder for a minimum predetermined period of time, and a sensor for detecting a possible interruption of the external power supply, the control program completing the current bond cycle and then suspending the further wiring when the sensor reports an interruption of the external power supply, as recited in claim 2. Therefore the rejection of claim 2 under 35 U.S.C. §103(a) should be withdrawn and claim 2 allowed.

Neither Miyazaki nor Nakamura taken either alone or in combination teaches or suggests that the wire bonder is set up to instantaneously switch off all electrical consumers not required for completion of the current bond cycle when the sensor reports an interruption of the external power supply as recited in claim 3. Therefore the rejection of claim 3 under 35 U.S.C. §103(a) should be withdrawn and claim 3 allowed.

Neither Miyazaki nor Nakamura taken either alone or in combination teaches or suggests a light curtain. The application of a light curtain to a wire bonder is not required, and current wire bonders do not contain such a light curtain. Therefore it is not obvious to install a light curtain on the wire bonder. Therefore the rejection of claims 13 to 15 under 35 U.S.C. §103(a) should be withdrawn and claims 13 to 15 allowed.

Claims 1-3 and 13-15 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Miyazaki (US Patent No. 5,463,197) in view of Schmidt et al. (WO 03/015974). The rejection is traversed and reconsideration is respectfully requested.

According to the Manual of Patent Examining Procedure (M.P.E.P.),

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in the applicant's disclosure.¹

Miyazaki discloses an apparatus and a method for forming a wire bonding ball. Miyazaki does not disclose a power module supplying electrical power to drive the bondhead. Col. 4, lines 27-33 read: *"Fig. 1 is the block diagram showing the construction of the wire bonder including the ball forming apparatus according to the present invention and a wire bonder controller. FIG. 2 is a block diagram showing in detail the power supply circuit of the torch of the ball forming apparatus."* Miyazaki does not even mention the term "bondhead" in his patent and he does not mention a power module supplying electrical power to drive the bondhead. Therefore Miyazaki fails to disclose at least

a bondhead,

a power module configured for supplying electrical power for operating a drive of the bondhead,

a power switch configured for controlling the supply of electrical power by the power module to the drive,

at least one emergency switch,

as recited in claim 1.

¹ M.P.E.P. § 2143.

The invention of Schmidt et al. relates to a rapid arc welding system for welding elements onto components. The inventive system comprises a welding head, a supply device for supplying elements to the component and a control and power device. The control and power device comprises a safety circuit for controlling the safety functions of the welding system which allows an operation that is especially safeguarded from unauthorized use of the system in which an operation disruption is partially cancelled. In this partial operation mode, individual components of the system can be activated selectively, especially for the purpose of maintenance (see abstract).

The invention of Schmidt et al. relates to a rapid arc welding system and not to a wire bonder. Besides the fact that Schmidt et al. fails to disclose all of the limitations of the claimed invention as recited in claim 1 directed to a wire bonder comprising a bondhead, a power module configured for supplying electrical power for operating a drive of the bondhead, and a power switch configured for controlling the supply of electrical power by the power module to the drive, Schmidt et al. fails to disclose at least one emergency switch being configured for producing upon activation a signal for causing the control program to complete a current bond cycle and then suspend the further wiring and for starting the timer, the timer being configured for opening the power switch after a predetermined period of time has elapsed, the predetermined period being sufficient to complete the current bond cycle as recited in claim 1.

The above mentioned basic criteria to establish a prima facie case of obviousness are not met. The person of ordinary skill in the pertinent art does not find any suggestion or motivation, neither in the references themselves nor in the knowledge generally available, to combine the references' teachings or to modify any of the references to arrive at the invention as recited in claim 1. Therefore the rejection of claim 1 under 35 U.S.C. §103(a) should be withdrawn and claim 1 allowed.

Claims 2, 3 and 13-15 depend from and thereby incorporate the limitations of claim 1. It therefore follows that Miyazaki and Schmidt et al. also contain insufficient teaching taken either alone or in combination to render claims 2, 3 and 13-15 obvious. Therefore, the rejection of claims 2, 3 and 13-15 under 35 U.S.C. §103(a) should be withdrawn and claims 2, 3 and 13-15 allowed.

Neither Miyazaki nor Schmidt et al. taken either alone or in combination teaches or suggests a wire bonder comprising an electrical power supply module guaranteeing on interruption of an external power supply the supply of electrical power to the wire bonder for a minimum predetermined period of time, and a sensor for detecting a possible interruption of the external power supply, the control program completing the current bond cycle and then suspending the further wiring when the sensor reports an interruption of the external power supply, as recited in claim 2. Therefore the rejection of claim 2 under 35 U.S.C. §103(a) should be withdrawn and claim 2 allowed.

Neither Miyazaki nor Schmidt et al. taken either alone or in combination teaches or suggests that the wire bonder is set up to instantaneously switch off all electrical consumers not required for completion of the current bond cycle when the sensor reports an interruption of the external power supply as recited in claim 3. Therefore the rejection of claim 3 under 35 U.S.C. §103(a) should be withdrawn and claim 3 allowed.

Neither Miyazaki nor Schmidt taken either alone or in combination teaches or suggests a light curtain. The application of a light curtain to a wire bonder is not required and current wire bonders do not contain such a light curtain. Therefore it is not obvious to install a light curtain on the wire bonder. Therefore the rejection of claims 13-15 under 35 U.S.C. §103(a) should be withdrawn and claims 13-15 allowed.

Claims 4-6 and 16-18 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Miyazaki (US Patent No. 5,463,197) in view of Nakamura (US Patent No. 6,566,770) as applied to claim 1 above and further in view of Sugimoto et

al. (US Patent No. 4,485,957) The rejection is traversed and reconsideration is respectfully requested.

Claims 4-6 each recite that the wire bonder further comprises a pressure sensor for measuring a pressure in a pressure supply line connected to the wire bonder, and that the control program completes the current bond cycle and then suspends the further wiring when the pressure measured by the pressure sensor falls below a predetermined value. Sugimoto et al. uses a pressure sensor to control the clamping force exerted on the wire by the clamping arms. With the present invention as recited in claims 4-6, the pressure sensor measures a pressure in a pressure supply line. Neither Miyazaki nor Nakamura taken either alone or in combination teaches or suggests a pressure supply line, and also Sugimoto et al. does not teach or suggest does not disclose that the pressure sensor measures the pressure in a pressure supply line. Therefore the combination of the teachings of Miyazaki and Nakamura and Sugimoto et al. cannot result in a wire bonder with the features of claim 4. For at least these reasons the rejection of claims 4-6 under 35 U.S.C. §103(a) should be withdrawn and claims 4-6 allowed.

Claims 16-18 depend from and thereby incorporate the limitations of claim 4, 5 or 6. It therefore follows that Miyazaki and Nakamura also contain insufficient teaching to render claims 16-18 obvious. Therefore the rejection of claims 16-18 under 35 U.S.C. §103(a) should be withdrawn and claims 16-18 allowed.

Furthermore, neither Miyazaki nor Nakamura nor Sugimoto taken either alone or in combination teaches or suggests a light curtain. The application of a light curtain to a wire bonder is not required and current wire bonders do not contain such a light curtain. Therefore it is not obvious to install a light curtain on the wire bonder. Therefore the rejection of claims 16-18 under 35 U.S.C. §103(a) should be withdrawn and claims 16-18 allowed.

Claims 4-6 and 16-18 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Miyazaki (US Patent No. 5,463,197) in view of Schmidt et al. (WO

03/015974) as applied to claim 1 above and further in view of Sugimoto et al. (US Patent No. 4,485,957) The rejection is traversed and reconsideration is respectfully requested.

Claims 4-6 each recite that the wire bonder further comprises a pressure sensor for measuring a pressure in a pressure supply line connected to the wire bonder, and that the control program completes the current bond cycle and then suspends the further wiring when the pressure measured by the pressure sensor falls below a predetermined value. Sugimoto et al. uses a pressure sensor to control the clamping force exerted on the wire by the clamping arms. With the present invention as recited in claims 4-6, the pressure sensor measures a pressure in a pressure supply line. Neither Miyazaki nor Schmidt et al. taken either alone or in combination teaches or suggests a pressure supply line, and also Sugimoto et al. does not disclose that the pressure sensor measures the pressure in a pressure supply line. Therefore the combination of the teachings of Miyazaki and Schmidt et al. and Sugimoto et al. cannot result in a wire bonder with the features of claim 4. For at least these reasons the rejection of claims 4-6 under 35 U.S.C. §103(a) should be withdrawn and claims 4-6 allowed.

Claims 16-18 depend from and thereby incorporate the limitations of claim 4, 5 or 6. It therefore follows that Miyazaki, Schmidt et al. and Sugimoto et al. also contain insufficient teaching taken either alone or in combination to render claims 16-18 obvious. Therefore the rejection of claims 16-18 under 35 U.S.C. §103(a) should be withdrawn and claims 16-18 allowed.

Furthermore, neither Miyazaki nor Schmidt et al. nor Sugimoto et al. taken either alone or in combination teaches or suggests a light curtain. The application of a light curtain to a wire bonder is not required, and current wire bonders do not contain such a light curtain. Therefore it is not obvious to install a light curtain on the wire bonder. Therefore the rejection of claims 16-18 under 35 U.S.C. §103(a) should be withdrawn and claims 16-18 allowed.

Claims 7-12 and 19-24 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Miyazaki (US Patent No. 5,463,197) in view of Nakamura (US Patent No. 6,566,770) as applied to claim 1 above and further in view of Behler et al. (US Pub. No. 2002/0093130). The rejection is traversed and reconsideration is respectfully requested.

According to the Manual of Patent Examining Procedure (M.P.E.P.),

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in the applicant's disclosure.²

Claims 7-12 are directed to a wire bonder comprising at least one vacuum sensor for monitoring a vacuum and a vacuum tank guaranteeing the supply of vacuum to the wire bonder for a minimum predetermined period of time on an interruption of an external vacuum supply, the control program completing the current bond cycle and then suspending the further wiring when the vacuum measured by the vacuum sensor falls below a predetermined value.

None of the references cited against claims 7-12 taken either alone or in combination teaches or suggests a vacuum tank. Therefore the combination of the references does not and cannot lead to a wire bonder having a vacuum tank. From this it follows that the references cited against claims 7-12 do not render claims 7-12

² M.P.E.P. § 2143.

obvious. For at least this reason, the rejection of claims 7-12 under 35 U.S.C. §103(a) should be withdrawn and claims 7-12 allowed.

None of the references cited against claims 19-24 taken either alone or in combination teaches or suggests a light curtain. Therefore the combination of the references does not and cannot lead to a wire bonder having a light curtain, and the application of a light curtain to a wire bonder is not required and current wire bonders do not contain such a light curtain. Therefore it is not obvious to install a light curtain on the wire bonder. Therefore the rejection of claims 19-24 under 35 U.S.C. §103(a) should be withdrawn and claims 19-24 allowed.

Claims 7-12 and 19-24 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Miyazaki (US Patent No. 5,463,197) in view of Schmidt et al. (WO 03/015974) as applied to claim 1 above and further in view of Behler et al. (US Pub. No. 2002/0093130). The rejection is traversed and reconsideration is respectfully requested.

According to the Manual of Patent Examining Procedure (M.P.E.P.),

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in the applicant's disclosure.³

Claims 7-12 are directed to a wire bonder comprising at least one vacuum sensor for monitoring a vacuum and a vacuum tank guaranteeing the supply of

³ M.P.E.P. § 2143.

vacuum to the wire bonder for a minimum predetermined period of time on an interruption of an external vacuum supply, the control program completing the current bond cycle and then suspending the further wiring when the vacuum measured by the vacuum sensor falls below a predetermined value.

None of the references cited against claims 7-12 taken either alone or in combination teaches or suggests a vacuum tank. Therefore the combination of the references does not and cannot lead to a wire bonder having a vacuum tank. From this it follows that the references cited against claims 7-12 do not render claims 7-12 obvious. For at least this reason, the rejection of claims 7-12 under 35 U.S.C. §103(a) should be withdrawn and claims 7-12 allowed.

None of the references cited against claims 19-24 taken either alone or in combination teaches or suggests a light curtain. Therefore the combination of the references does not and cannot lead to a wire bonder having a light curtain and the application of a light curtain to a wire bonder is not required and current wire bonders do not contain such a light curtain. Therefore it is not obvious to install a light curtain on the wire bonder. Therefore the rejection of claims 19-24 under 35 U.S.C. §103(a) should be withdrawn and claims 19-24 allowed.

In view of the foregoing, it is respectfully submitted that claims 1-24 are in condition for allowance. All issues raised by the Examiner having been addressed, an early action to that effect is earnestly solicited.

Application No.: 10/802,205
Office Action dated: April 9, 2007
Response to Office Action dated: July 9, 2007

No fees or deficiencies in fees are believed to be owed. However, authorization is hereby given to charge our Deposit Account No. 13-0235 in the event any such fees are owed.

Respectfully submitted,

By /Daniel G. Mackas/
Daniel G. Mackas
Registration No. 38,541
Attorney for Applicants

McCORMICK, PAULDING & HUBER LLP
CityPlace II, 185 Asylum Street
Hartford, CT 06103-3402
(860) 549-5290
Customer No.: 35301